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CERTIFICATE

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 15 January 2003 with an application for Letters Patent number 523665 made by RAJEEV PRASAD GUPTA.

Dated 7 January 2004.

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PROVISIONAL SPECIFICATION

Title *Process To Use Microwave Energy*

I, Gupta Prasad, Rajeev,

Nationality: Indian citizen

Address: 11/16A Colson Street, Avalon, Lower Hutt, New Zealand,

do hereby declare this invention to be described in the following statement :

- 1 -

PROCESS TO USE MICROWAVE ENERGY

FIELD OF INVENTION

This invention relates to a process to use microwave energy to convert food grade material or agricultural waste material, or the like, into thermal energy, and in particular convert organic waste matter into thermal energy. The invention also relates to a method of determining the nutritional value of food items, more particularly, organic matter.

The invention also relates to a process that investigates the absorption of microwaves in food particles and organic waste.

The invention also relates to a process to convert organic matter into a combustible fuel. It is also an invention of a new source of renewable energy.

BACKGROUND OF INVENTION

This invention relates to a process to use microwave energy in an entirely different and innovative way. This new process will lead us to develop products that will convert waste or fresh food grade material into heat energy and add to our knowledge base to improve our economy and our health.

In the investigation into microwave energy and in the process of the use of microwave energy to heat food, it was found that the common-believe fact that microwaves are attracted, like magnets, to fat, sugar and water within food to heat the food, appears to be incorrect. Surprisingly, it was found that refined sugar does not heat up in a microwave oven.

A microwave oven uses microwaves to heat food, which are radio waves at a frequency of roughly 2,500-megahertz. It is believed that water, fats and sugar in food absorb radio waves in this frequency range. Further it is believed that the radio waves absorbed are converted directly into atomic motion, which results in an increase in the temperature in the food.

Most plastics, glass or ceramics do not absorb microwaves in this frequency range, and metal reflects microwaves.

Food and other non-metallic polar chemicals do absorb microwave energy. However, there appears to be a selective adsorption of microwave energy by food and non-metallic polar chemicals. For example, cooking oil when subjected to microwave energy does not heat particularly well.

It is therefore believed the absorption of microwave energy by organic matter is governed by a different set of rules than what is was previously and commonly suggested.

Waste products are a direct by-product of preparing food products. For example, potatoes are peeled and these peels are discarded. These by-products of conventional cooking fill up our waste fills. Consequentially there has been a long felt need to provide an environmentally friendly method to use waste food scraps and to reduce organic waste.

In addition, the fossil fuels of this planet are depleting and there is a growing need to establish innovative methods in producing energy.

There is also a need for an environmentally friendly way to dispose of waste food and reduce the size of the landfills.

The present invention proposes to overcome the above problems by using waste organic matter in combination with microwaves to produce thermal energy.

In addition the present invention provides a new method to determine the nutritional value of organic materials.

OBJECT OF THE INVENTION

It is the object of the present invention to use organic matter in combination with microwaves to produce thermal energy to address the foregoing identified problems, or at least to provide the public with a useful choice.

It is the object of the present invention is to (devise/ investigate) a new process to convert organic waste matter into thermal energy.

It is another object of this invention to provide a process that investigates the absorption of microwaves in food particles and organic matter. The new process facilitates the absorption of microwaves by organic matter.

It is another object of the invention to provide a method to determine the nutritional value of organic food items.

It is another object of this invention to establish a correlation between the nutritional value of organic matter and its absorption of microwave energy.

STATEMENT OF THE INVENTION

Primarily, the present invention, which will be described subsequently in greater detail, is to provide a new method for using microwave energy as mentioned heretofore and many novel features that result in the investigation of the absorption of microwave energy in organic matter that is not anticipated, rendered obvious, suggested, or even implied by any of the prior art, either alone or in any combination thereof.

In a first aspect the invention provides a method that facilitates the microwave absorption level in organic waste matter and in combination with microwave energy produces thermal energy.

The new process converts an organic matter into a combustible material, or fuel to provide thermal energy.

Another object of the invention is to provide a method to convert organic matter, preferably organic waste matter into thermal energy comprising of the following steps:

1. Subject the organic matter to an elevated temperature until the organic matter stops generating smoke and is converted into black carbon.
2. Allow the organic matter to return to a lower temperature, preferably room temperature.
3. Subject the organic matter to microwaves sufficient to initiates combustion and to generate heat.
4. Use the heat generated from the organic matter to generate electricity.

Preferably a microwave oven is used to heat the organic matter.

Preferably the organic waste matter is placed in the microwave oven for 1 to 3000 seconds, more preferably 15 to 30 seconds.

Preferably the process is a continuous process.

Preferably the organic waste matter is a food item.

Preferably the organic waste matter are potatoes and apples.

Another aspect of the invention is to provide a process that investigates the absorption of microwaves in food particles and organic matter

Another aspect of the invention relates to a method of determining the nutritional value of organic material comprising of the following steps:

1. Subject the organic matter / food item to microwaves.

2. Measure the rise in temperature of the food item, within a given time.
3. Calculate the nutritional value of the organic material by determining the amount of heat absorbed and the resultant rise in temperature

Preferably a microwave oven is used to heat the organic matter.

Preferably the organic matter is placed in the microwave oven for 1 to 3000 seconds, more preferably 15 to 30 seconds.

Preferably the organic waste matter is placed in the microwave oven either continuous or for 1 to 3000 seconds.

Preferably the organic material is a food item.

The above mentioned aspects should be read disjunctively with the object to at least provide the public with a useful alternative.

SUMMARY OF THE INVENTION

In the course of the investigation to establish a correlation between the level of nutritional value of food and the level of microwave energy absorption, a new process was discovered to increase the microwave energy absorption in organic matter which results in the generation of thermal energy. This new process allows the use of microwave energy in an innovative way.

Surprisingly it was found that when food is subjected to microwave energy in a microwave oven, the temperature of the food rises, and more particularly the temperature of non-metallic polar chemicals in the food rise in temperature when subjected to the microwave energy.

These non-metallic polar chemicals absorb microwave energy and therefore increase in temperature.

Although different food items are not classified or graded according to their absorption level of microwave energy, there does appear to be selective absorption of microwave energy by different food items.

An experimental set-up was designed to find out the extent at which different food items would absorb microwave energy. The inventor conducted a series of experiments to establish the extent of microwave energy absorption by different food items. The purpose of the experiment was to correlate the absorption of microwave energy with the quality of food.

This establishes a correlation between the level of nutritional value and the level of microwave energy absorption.

In doing so, a new process was discovered which increases microwave energy absorption by food material.

This process increases the efficiency of microwave energy absorption by food material. When a particular food item undergoes this process, the absorption of microwave energy increases. As there is a significant increase in microwave energy absorption, there is a substantial increase in the temperature of the food item. At this stage the item converts into a fuel.

The process involves subjecting a food item to an elevated temperature for an extended time until it is converted into carbon, cooled and then subjected to microwave energy for a period of time. This results in subjected matter to absorb more microwave energy.

When the food item subjected to the microwave energy reaches its flash-point temperature, the food-item will ignite at an increased temperature, producing more energy. The food item is now a new fuel to generate thermal energy.

It is known that once wood or charcoal is ignited and is placed in a microwave oven, the flame of the wood or charcoal will generate a glow and arc. However, if wood or charcoal at room temperature is placed in a microwave oven, it will not ignite or glow.

Whereas, the herein-explained process involving microwaves burns the food item, even if it is initially at a room temperature.

This burning process consumes the food item and converts it to energy and smoke with very small amount of ash. The process provides us with a way to generate thermal energy from agriculture / organic waste.

The foregoing examples are illustrative only and, where specific integers are mentioned which have known equivalents, such equivalents are deemed to be incorporated herein as if individually set forth.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 provides a representation of a block diagram utilizing the invention to generate power.

Figure 2 provides a representation of a flow chart for the fuel burning process.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In this embodiment of the invention, the method to generate energy is described with reference to Figure 1.

The process to convert a food material into a combustible substance involves the following steps:

1. A food item is subjected to an elevated temperature by a heating device such as a hot plate or a conventional grill. It is not necessary to heat a scrap food item separately as it may be heated while other heating or cooking activities are in progress. This process can be included to save energy.

2. The food item is heated to a high temperature until it ceases generating smoke and/or is converted into a black carbon. At this stage, heating is stopped and the item is removed from the heating device to cool down to room temperature.
3. After cooling down to room temperature, the food item is placed in a baking-glass chamber and subjected to microwave energy from a microwave oven.
4. After an elapsed time, for example 15 to 30 seconds, the item becomes red hot and in a flash of light, flames erupt from the food item and it burns with an audible noise.

The food item burns releasing a high amount of heat energy and smoke. There is a significant rise in the temperature. This process provides a significant temperature rise in the first 15 to 30 seconds as compared with a normal piece of food item, which has not undergone the same process.
6. The food item is converted into heat, carbon dioxide and some other gases. There is a significant reduction in weight of the initial sample. The ash content of this burning process is low.
7. This process appears to be more applicable to food items as non-food items do not absorb microwave energy well and do not burn as in the above-mentioned process.

The above process is not applicable to wood, plastic or any other similar inedible objects. It is not successful with charcoal. The above process when applied with apple/ potato chunks and its skins were found to be very successful. The process is also applicable for other food items.

Figure 1 represents a product that has been envisaged on the basis of the above observations, which would help produce the energy from the burning sample.

In this embodiment of the invention, the absorption of microwave energy in a food item is described with reference to Figure 2.

The microwave energy absorption is higher in a starch or protein rich food. It is observed that the microwave energy absorption in a refined sugar is at least ten times less than that in a raw sugar cane. Raw sugar cane is considered to be more nutrient-rich as compared to refined sugar.

Particular fruits and vegetables absorb microwave energy to a greater extent than other fruits and vegetables. Food items with a higher absorption rate convert into black carbon and burn much quicker and efficiently when subjected to microwave energy.

Microwaves heat up most of the food items, however in the case of some items, after the evaporation of water content, the energy absorption stops completely and there is no further increase in temperature.

However after drying, some food items continue to heat up when subjected to microwave energy, thus releasing thermal energy.

Figure 2 represents the inventive process using apple and potato. The process is successful both for the waste skins and chunks of apple or potato.

1. The apple or potato is subjected to a high temperature by a heating device such as hot plate or in a conventional grill. This process is a by-product of any heating process.
2. The apple or potato is subjected to the high temperature until it stops generating smoke and is converted into black carbon. The black carbon further heats up, so as to cause slight red spots. At this stage, the heating is stopped and the item is removed from the heater to cool down.
3. After cooling down to room temperature, the piece of carbon is placed inside a glass-baking utensil and is heated in a microwave oven.

4. After approximately 1 to 300 seconds, more preferably 15 to 30 seconds, the carbon item becomes red hot and with a flash of light and a loud noise the food item erupts into flames.
5. The carbon item starts burning like a piece of wood, releasing very high amount of heat energy.

ADVANTAGES:

The invention provides the following advantages:

- Increases the absorption level of organic waste matter.
- Provides an alternative -and renewable source of energy.
- Environmentally friendly method to use waste food scraps.
- Products would be designed, based on this new process of using microwave to convert some of the waste or fresh food grade materials (or organic waste matter) into heat energy.
- The process would provide us an added knowledge and an innovative way to decide the nutritional value of various food items.
- The new process would lead to develop our knowledge base to improve economy and health.
- Provides an effective way to reduce landfills and improve the environment.
- Reduces the pollutants in the atmosphere.
- No similar product exists on the market and therefore the product satisfies a long felt need.
- Agricultural waste can be utilized in this process.
- Provides for portable equipment for electricity generation without using fossil fuel.
- Provides for lightweight equipment for electricity generation.
- Provides energy to operate equipment such as vehicles, machinery and plants.
- Offers a “green” alternative.

VARIATIONS:

Some preferred aspects of the invention have been described and illustrated by way of example, but it will be appreciated that other variations of and modifications to the invention can take place without departing therefrom.

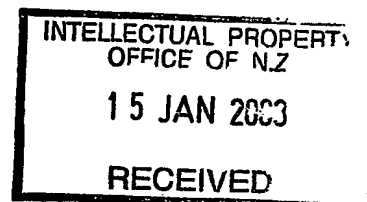
The above idea of a unique process is further investigated to find out the different type of food/organic wastes, which would provide similar or better results.

During the above-mentioned experiments, a correlation between the level of microwave energy absorption and the content of food material was established.

PIPERS

Patent Attorney's for

Rajeev Prasad



Smoke Exhaust

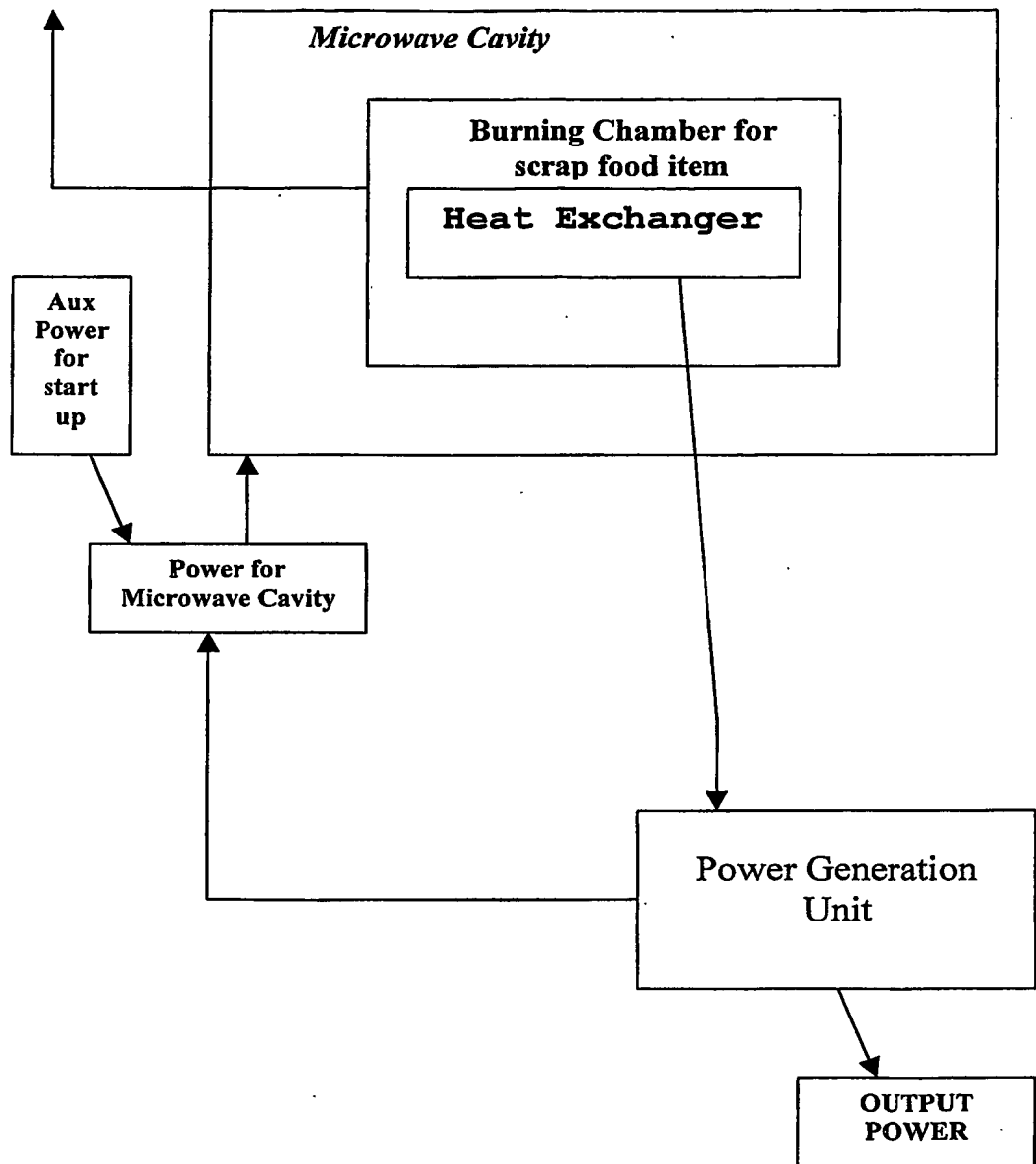


Figure 1

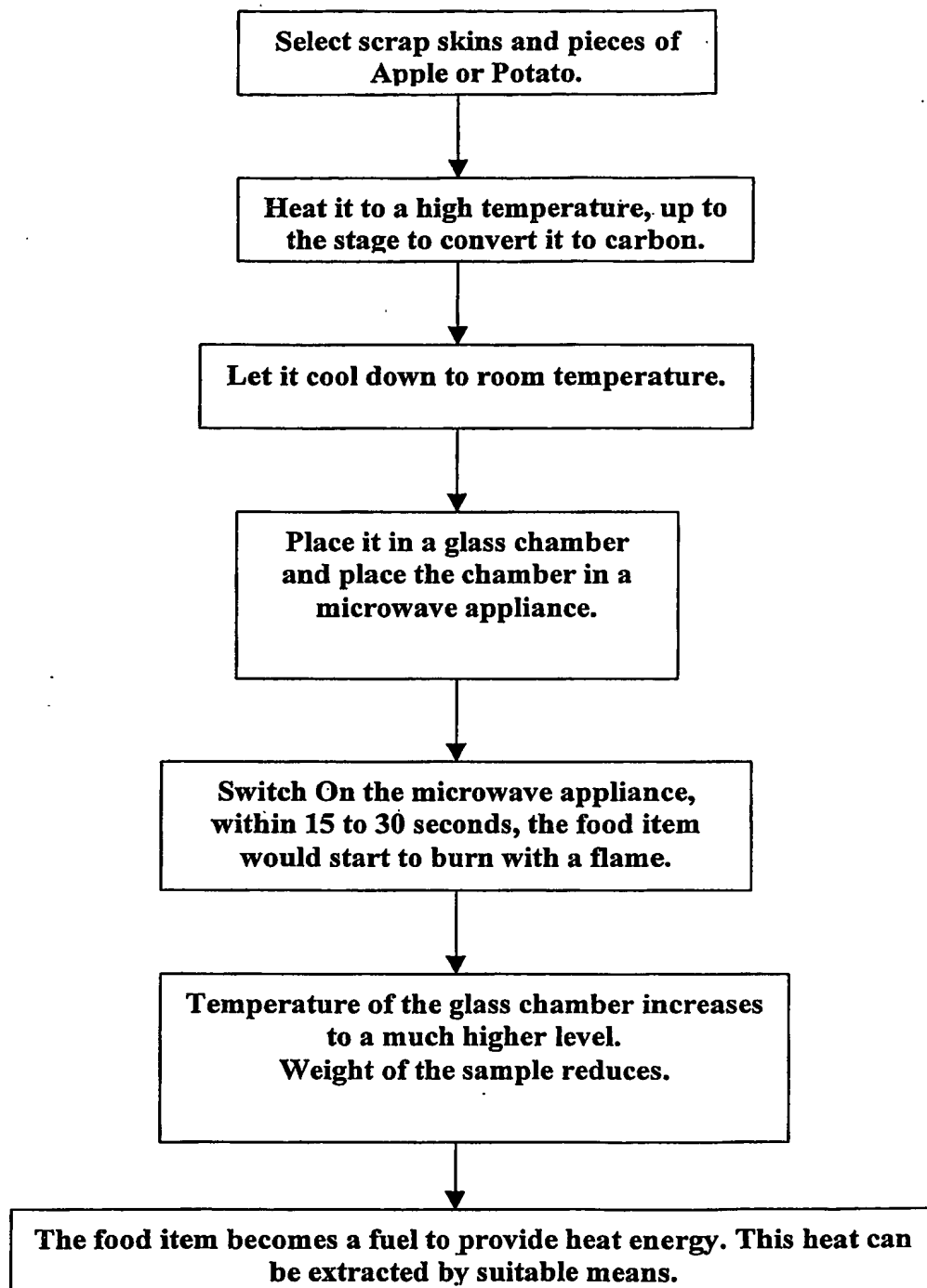


Figure 2

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